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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/643,597	08/19/2003	Walter H. Whitlock	M02A454	3964

7590

04/28/2005

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EXAMINER

EL ARINI, ZEINAB

ART UNIT

PAPER NUMBER

1746

DATE MAILED: 04/28/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No. 10/643,597	Applicant(s) WHITLOCK, WALTER H.	
	Examiner Zeinab E. EL-Arini	Art Unit 1746	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-21 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |  |
|---|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)            |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date ____ | 6) <input type="checkbox"/> Other: ____  |

*jm*

*re*

## **DETAILED ACTION**

### ***Specification***

1. The disclosure is objected to because of the following informalities: In the specification, page 11, line 20, "contentsLiquid" is confusing and indefinite term. It is suggested that after "contents", --"."----should be inserted.

Appropriate correction is required.

### ***Claim Rejections - 35 USC § 112***

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 1-21 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to

particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 1, lines 7-8, claim 8, lines 8-9, 11-12, line 14, claim 10, line 2, claim 11, line 8, 11, 13, claim 12, line 2, "said wafer", lacks antecedent basis.

4. Claims 13-15 are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential elements, such omission amounting to a gap between the elements. See MPEP § 2172.01. The omitted elements are: the cleaning element, because applicant recited a system for cleaning a surface, without reciting the element for cleaning a surface of a semiconductor wafer.

5. Claims 16-21 are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential steps, such omission amounting to a gap between the steps. See MPEP § 2172.01. The omitted steps are: the steps of mixing a liquefied gas component and liquid component.

6. In claim 21, line 2, “passively” is relative and indefinite term.

7. Claims 6 and 7 are confusing.

8. Claims 1-12 are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential steps, such omission amounting to a gap between the steps. See MPEP § 2172.01. The omitted

steps are: the step of cleaning the surface of semiconductor wafer.

***Claim Rejections - 35 USC § 103***

9. Claims 1-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over DeYoung et al. (US 2002/0112747) in combination with Nishio (6,612,818).

DeYoung et al. disclose a process and apparatus for cleaning a semiconductor wafer using dense phase carbon dioxide. Dense carbon dioxide is stored in a high-pressure vessel (I) (50) (at pressure between 300 and 5000 psi), the wafer is loaded into a cleaning chamber (III)(51). Cleaning chamber (III) is pressurized with clean carbon dioxide from either a bulk storage tank through valve (i)(55) or from pressure vessel (I)(50) through valve

(a)(56) to a pressure of between 300 psi and 5000 psi.

Highly filtered chemical adjuncts are added to the cleaning chamber from adjunct addition module (VI)(61) through valve (b)(62) during addition of dense CO<sub>2</sub> or alternatively prior to the addition of dense CO<sub>2</sub>. The reference discloses conveying a dense gas component and a liquid component to a vessel, applying an elevated pressure to said vessel, and contacting said component with the surface of the wafer. The reference discloses the dense component and the liquid component (isopropyl alcohol), the pressure, and the mixing steps as claimed. See paragraphs 40-41, 48-54 and 63, and Fig.4.

DeYoung et al. do not teach using a bellows accumulator as claimed.

Nishio discloses a bellows type pump or accumulator for transporting chemical liquid in various process such as washing surfaces of liquid crystal display devices in semiconductor producing apparatus. See col. 1, lines 14-46, col. 2, lines 6-18.

It would have been obvious for one skilled in the art to use the accumulator taught by Nishio instead of the pressure vessel taught by DeYoung et al. to obtain the claimed process and system, and to improve the cleaning process. This is because both accumulator and pressure vessel used to elevate the pressure of the cleaning component. It would have been obvious for one skilled in the art to adjust the flow rate to obtain the component velocity as claimed.



10. Claims 1-2, 5, 8-19, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Barton (6,085,762) in combination with Nishio.

Barton discloses a process and system for cleaning a surface of a semiconductor wafer. The reference discloses conveying a component comprises a dense gas component, a liquid component, and a mixture thereof to a tank, applying an elevated pressure to said tank, contacting the component with a surface of semiconductor wafer. The reference discloses the dense gas, the mixing process , and the pressure as claimed. See col. 3, lines 39- 67, col. 4, lines 51-55, col. 5, lines 18-21, col. 7, lines

46-62, col. 8, lines 2-5, 11-20, 29-54, col. 12, lines 1-15,  
the claims and Fig. 1.

Barton does not teach the bellows accumulator as  
claimed.

Nishio as discussed supra discloses the bellows  
accumulator as claimed.

It would have been obvious for one skilled in the art to  
use the accumulator taught by Nishio instead of the ballast  
tank taught by Barton to obtain the claimed process and  
system, and to improve the cleaning process. Simply  
alternating choice of tank because Barton discloses that to  
render the process as continuously efficient as possible by  
providing a ready source of pressurized fluid at any time  
needs this.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Zeinab E. EL-Arini whose telephone number is (571) 272-1301. The examiner can normally be reached on Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Barr can be reached on (571) 272-1414. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

*Zeinab E. EL-Arini*  
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Primary Examiner  
Art Unit 1746

ZEE  
04/25/05